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**NAVAL WAR COLLEGE  
Newport, R.I.**

**Maritime Trade Warfare: A Challenge to the Chinese A2/AD System**

**by**

**Ryan P. Conole**

**LCDR, USN**

**A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.**

**The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.**

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## **Abstract**

The modern Chinese anti-access and area denial (A2/AD) systems highlights the added complexity modern weapons and sensors have imposed on maritime warfare. Many discussions have focused on how to defeat Chinese A2/AD systems and operate effectively in an environment chosen and shaped by our potential adversaries. Such strategies demand a large expenditure of force and hinge on maintaining a technological advantage over adversaries, two assumptions that may not be valid in future conflicts. Attacking China's maritime trade offers an attractive means to realize operational and strategic objectives without directly challenging A2/AD systems tasked with sea denial. It is important to evaluate the considerations at the strategic and operational levels for executing a successful maritime trade warfare campaign against China to thwart her prepared A2/AD defenses. Operational factors favor such a campaign, methods can be employed to target shipping that intend to violate a blockade, and neutral rights can be protected. By attacking Chinese trade, the United States would weaken and isolate China during a prolonged conflict at a reduced level of risk compared with directly challenging China's A2/AD system.

## INTRODUCTION

Since the end of the Second World War, the United States has successfully projected power globally to realize operational and strategic goals.<sup>1</sup> The U.S. has employed military power to great effect against every opponent with whom it has engaged in hostilities within the past three decades. It has done so with minimal risk to U.S. forces by degrading an opponent's ability to exercise command and control, provide sustainment, and freely move forces by employing devastating operational fires.

The vast expanse of water in the East and South China Seas traditionally offered the United States an operating environment that allowed for the deployment of carrier-based strike aircraft to complement land-based aircraft stationed in the region. These forces could be used to limit Chinese actions hostile to U.S. interests. In recent memory, the U.S. deployed two carrier battle groups to the waters off Taiwan during the 1996 Taiwan Strait Crisis, demonstrating that American force could be used to limit Chinese aggression toward a neighbor.<sup>2</sup> China, recognizing the threat posed by the U.S.'s ability to project power, developed a sophisticated A2/AD system in depth in response. The Chinese A2/AD system challenges the United States with a variety of threats. A fleet of modern conventional submarines, large surface combatants and flotillas of small fast attack missile boats all pose threats to U.S. forces. The long range DF-21 anti-ship ballistic missile has expanded the reach of Chinese force well beyond what has been faced in past maritime conflicts. Additionally, Chinese cyber and space capabilities pose new challenges that could be used to attack the U.S. function of command and control. These capabilities, combined with a large

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<sup>1</sup> Jan Van Tol, "AirSea Battle: A Point-of-Departure Operational Concept," *Center for Strategic and Budgetary Assessment*, May 18, 2010, 2. <http://www.csbaonline.org/publications/2010/05/airsea-battle-concept/>.

<sup>2</sup> Ibid

and modern land-based air force, would need to be countered for the U.S. to successfully project power in the region. Chinese A2/AD systems create a difficult, or impossible, operational environment for U.S. forces in the maritime domain close to the Chinese mainland.

While focusing on new technologies, tactics and strategies to broach the Chinese A2/AD system is important, it is also necessary to examine other options to influence China without placing our forces in the teeth of Chinese defenses. A distant blockade, targeting maritime trade, offers a means to have devastating strategic effects on China and could negate the value of their A2/AD system. Properly employed, it could complement any other direct actions conducted against the A2/AD system and provide an alternative if direct action is impossible due to lack of effective force. Though continental in expanse, China is a maritime nation. Over 85 percent of her trade is carried on the seas and her trade routes pass to over six hundred ports in over 150 nations.<sup>3</sup> The vast expanse of this trading network and the geography of China's major SLOCs, makes it difficult to defend if Chinese force is employed in a sea denial role in the Near Seas. Targeting trade may cut China off from the food, oil and raw materials on which her economy relies. The threat of a trade war could give the Chinese reason to carefully consider any military action against the U.S. and provides a tailorable, de-escalatory response to Chinese aggression that limits risk to U.S. forces and provides political and military freedom of action.

## **LEGAL CONSIDERATIONS**

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<sup>3</sup> Michael D. Wood, "Chinese Maritime Power – Is the Increase in China's Maritime Power Internally Consistent with China's National Interests and Foreign Policy, or Cause for Concern?" (Kingston, Ontario: Royal College of Defense Studies, July 2012), 10.

International law has three generally accepted requirements for a blockade to be legal.<sup>4</sup> First, the blockade must be openly declared. The declaration must include the area to which it will apply, the date the blockade will begin and a time period that neutral vessels may depart the blockaded zone.<sup>5</sup> Secondly, notification must be provided to those affected, including neutral nations.<sup>6</sup> Finally, the blockade must be impartial and not favor the rights of any one nation over another.<sup>7</sup> While the age of instant communication may make the formal announcement of a blockade seem antiquated, the requirements to declare an impartial blockade provides the U.S. an opportunity to explain the reason and rationale behind her actions while fulfilling obligations under international law. The blockade can be presented as a moderate act, aimed at de-escalating a conflict with China instead of employing U.S. power directly against her military forces. The U.S. can stress that ships that comply with the terms of the blockade will be safe. At the same time, the U.S. should strongly state the danger to which any ship which violated the blockade would be subject. Risks of violating the blockade, to include search, seizure or sinking, must be clearly communicated to the international community. By explaining the terms of the blockade clearly before it has commenced, the U.S. may mitigate later issues if force is used to damage or sink ships attempting to run the blockade.

Some may see a blockade as a way to engage in a conflict short of actual war with China, perhaps in response to the threat of future Chinese aggression. It may be seen as a means where force could be employed against Chinese trade but without the bloodletting expected during open conflict, an effort to dissuade China from taking an action that would

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<sup>4</sup> Wolff Heintschel Von Heinegg, "From *Naval Blockade and International Law*," in *Naval Blockades and Seapower: Strategies and Counter-Strategies, 1805-2005*, ed. Bruce Elleman (New York: Routledge, 2006), 18.

<sup>5</sup> Ibid., 14.

<sup>6</sup> Ibid., 18.

<sup>7</sup> Ibid., 18.

lead to belligerency with the U.S. or her allies. This idea that a blockade can be employed in any way short of war should be dismissed. A blockade is a belligerent action in and of itself. Because military force must be used to enforce a blockade, any blockading action would be considered an armed conflict under international law.<sup>8</sup> By declaring a blockade, the U.S. would invite military retaliation from Chinese forces using all legal means. As a belligerent act under international law, a blockade of China should only be initiated by political leadership if the decision to wage war on China has been made and the consequences of such a decision have been accepted.

### **POLITICAL CONSIDERATIONS**

A campaign focused on maritime warfare is a safer course of action than a campaign aimed at degrading Chinese A2/AD systems. Proposed strategies for eliminating China's A2/AD systems rely on long range kinetic strikes on the Chinese mainland.<sup>9</sup> In the opening stages of a limited conflict, strikes on Chinese land-based A2/AD systems could be escalatory in nature. It may encourage China to widen a war with serious implications for the U.S and her potential allies. Chinese leaders may find it difficult to employ their vast arsenal of ballistic missiles on U.S. bases in Japan or Korea in a limited conflict due to political concerns and fears of escalating a military response from the opposition.<sup>10</sup> These fears of condemnation would quickly melt away if the U.S. conducted operations where kinetic strikes on Chinese territory were executed. U.S. strikes on Chinese missile systems may even prompt China to authorize their use in order to employ the weapons before they are lost. Concentrated attack by Chinese ballistic missiles on U.S. bases could destroy repair,

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<sup>8</sup> Ibid., 10.

<sup>9</sup> William Yale, "Air-Sea Battle: A Dangerous Unaffordable Threat," *The Diplomat*, November 9, 2013, <http://thediplomat.com/2013/11/air-sea-battle-a-dangerous-unaffordable-threat/>.

<sup>10</sup> Toshi Yoshihara, "Chinese Missile Strategy and the U.S. Naval Presence in Japan," *Naval War College Review* 63 no. 2: 54.



logistical and refueling facilities, making them unusable and complicating long term operations for U.S. forces.<sup>11</sup> Strikes on allied nations hosting U.S. forces may intimidate local governments and drive them to demand the removal of U.S. forces or impose limitations on the nature of their operations. Finally, if U.S. strikes on the Chinese mainland were threatening enough, there is a risk that China may escalate the conflict by the use of nuclear weapons.<sup>12</sup>

A campaign of maritime trade warfare has the potential to discourage escalation as quickly as direct strikes on China's A2/AD systems. The blockade's effects would take time to harm the Chinese economy, but its destructive long term implications should be clear to Chinese leadership immediately. It would not likely be viewed as a near-term existential threat to the Chinese state, and would offer China an opportunity to seek a settlement while the level of violence was low enough to allow for face-saving negotiation.<sup>13</sup> Trade warfare could be tailored, focusing initially on one commodity to demonstrate the effectiveness of a blockade and expanded in scope to cover a wider range of products. It could be aided by the threat or actual use of mines as an escalatory step aimed at coercing Chinese leadership into negotiation. Direct strikes on China would enflame Chinese public opinion and may make a negotiated settlement impossible. Most importantly, direct strikes on China may not be approved by the U.S.'s political leadership in a time of crisis. A maritime trade warfare campaign would give options to U.S. leadership short of direct strikes, which could still be flexibly employed if the situation warranted.

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<sup>11</sup> Ibid., 53.

<sup>12</sup> T.X. Hammes, "Offshore Control is the Answer," *Proceedings*, December 2012, <http://www.usni.org/magazines/proceedings/2012-12/offshore-control-answer>.

<sup>13</sup> T.X. Hammes, "Strategy for an Unthinkable Conflict," *The Diplomat*, July 27, 2012, <http://thediplomat.com/2012/07/military-strategy-for-an-unthinkable-conflict/>.

## **OPERATIONAL FACTORS – SPACE AND FORCE**

The key advantage the Chinese A2/AD system relies on is proximity to the mainland. The short distance between the Chinese mainland and the South and East China Seas makes operations difficult for the U.S. and allows China to bring all available components of military power to bear in a limited area. It allows for a layered defense providing units that lack extended endurance such as small missile craft and conventional submarines to be employed effectively near the coast while placing U.S. forces at risk further afield by long range anti-ship missile systems that require precision targeting from land-based systems and land based aircraft.<sup>14</sup> Breaching this kind of defense may be costly, and the A2/AD systems employed by China may not allow the U.S. to exercise sea control in the areas of the South and East China Seas. To be successful in a conflict with China, the U.S. should focus operations outside of the A2/AD envelope, and a distant blockade combined with aggressive attacks on Chinese trade is a viable option to avoid Chinese defenses.

A distant blockade would encompass all operations conducted beyond the A2/AD envelope that would deter, disrupt and sever maritime trade links between China and the rest of the world. It would not seek to keep Chinese combatants in port, but would concentrate on the merchant shipping seeking to call on Chinese ports. A distant blockade provides the same effects as a close blockade but reduces risk to the force, preserving strength for follow-on operations. A distant blockade would be difficult for China to counter. By intercepting merchant vessels far from the Chinese mainland, a distant blockade would complicate a Chinese response by “affecting its ability to influence events overseas” by expanding the

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<sup>14</sup> Van Tol, *AirSea Battle*, 42.

battle space.<sup>15</sup> As distances increase, the force available to China to disrupt U.S. naval operations decrease. A blockading force operating in the seas between Singapore and Borneo, the Celebes Sea, and waters to the north-west of Guam would be outside the estimated range of Chinese anti-ship ballistic missiles<sup>16</sup> and negate the employment of small missile attack craft which have been limited to a range of 400NM at operational speed<sup>17</sup>. A distant blockade may also lessen exposure to Chinese land-based aircraft, which would be required to conduct “longer missions, which consume fuel, cockpit hours and maintenance resources at an accelerated pace.”<sup>18</sup> The weakness in Chinese in-flight refueling capabilities could make missions by land-based aircraft against a blockading force in the farthest parts of the South China Sea difficult without forward basing aircraft at smaller installations.<sup>19</sup> This leaves China her major surface combatants and long range submarine assets to contest a blockading force. By focusing on blockading actions far from China’s mainland, the U.S. would reduce risk to the forces employed and simplify the type and nature of threats faced by them.

A distant blockade could take advantage of the geographical constraints imposed on Chinese trade routes. In the First World War, the United Kingdom was able to execute a distant blockade of the Central Powers and was aided by geography. The chokepoints formed by the Dover Straits, Strait of Gibraltar and Suez were exploited to provide control

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<sup>15</sup> Milan Vego, *Joint Operational Warfare: Theory and Practice* (Newport, RI: Naval War College, 2009), III-11.

<sup>16</sup> David Cohen, “China Confirms Carrier Killer,” *The Diplomat*, July 15, 2011. <http://thediplomat.com/2011/07/china-confirms-carrier-killer/>.

<sup>17</sup> John Patch, “Chinese Houbei Fast Attack Craft: Beyond Sea Denial,” in *China’s Near Seas Combat Capabilities*, ed. Peter Dutton (Newport, RI: Naval War College Press, 2014), .8.

<sup>18</sup> David Shlapak, “Chinese Air Superiority in the Near Seas,” in *China’s Near Seas Combat Capabilities*, ed. Peter Dutton (Newport, RI: Naval War College Press, 2014), 65.

<sup>19</sup> *Ibid.*, 65.

over merchant shipping forced to transit through them.<sup>20</sup> The U.S. should apply the same principles when executing a blockade of China. Over 40 percent of Chinese oil imports pass through the Strait of Hormuz and 82 percent of her oil imports pass through the Strait of Malacca.<sup>21</sup> Chinese President Hu Jintao estimated that 80 percent of all Chinese trade transited through the Strait of Malacca.<sup>22</sup> Both chokepoints present the U.S. an excellent opportunity to divert or destroy Chinese flagged vessels and screen and evaluate merchant vessels steaming to other Asian nations. The nature of the chokepoints allows for the economy of force for blockading efforts since a force in the straits will be able to interact with a majority of the shipping involved in trade with China. Over 77,000 vessels of all types transited through the Strait of Malacca in 2013, making efforts to identify ships carrying goods bound for China seemingly impossible.<sup>23</sup> A distant blockade centered in the Strait of Malacca could focus efforts on specific types of cargo, such as oil carriers or bulk container ships, drastically reducing the number requiring boarding. It is estimated a force of six surface warships could effectively board and search 54 vessels a day, or over 19,000 a year, if bills of lading could be electronically verified by U.S. forces.<sup>24</sup>

This force estimate does not take into account adding additional boarding teams to surface vessels or the employment of helicopters to move boarding teams quickly. With room for additional personnel and adequate aviation facilities, large amphibious ships may be

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<sup>20</sup> Paul Halpern, "From World War I: *The Blockade*," in *Naval Blockades and Seapower: Strategies and Counter-Strategies, 1805-2005*, ed. Bruce Elleman (New York: Routledge, 2006), 94.

<sup>21</sup> Milan Vego, "Chinese Shipping Could be Risky Business," *Proceedings*, April 2014.

<http://www.usni.org/magazines/proceedings/2014-04/chinese-shipping-could-be-risky-business>.

<sup>22</sup> Jasnea Sarma and Matthew Reinert, "The Malacca Dilemma" Indian Institute of Technology China Studies Center, last modified August 13, 2013, <http://csc.iitm.ac.in/?q=node/375>.

<sup>23</sup> Marine Department of Malaysia, Government of Malaysia, accessed May 3, 2014, [http://www.marine.gov.my/jlmeng/pic/article/NUMBERS\\_OF\\_SHIPS\\_REPORTING\\_UNDER\\_STRAITREP\\_UNTIL\\_MARCH2014.pdf](http://www.marine.gov.my/jlmeng/pic/article/NUMBERS_OF_SHIPS_REPORTING_UNDER_STRAITREP_UNTIL_MARCH2014.pdf).

<sup>24</sup> Gabriel B. Collins and William S. Murray, "No Oil for the Lamps of China?" *Naval War College Review*, vol 61, no. 2 (Spring 2008): 87.

particularly suited for the role of merchant visitation. Ships bound for China could attempt to circumvent the blockade by taking alternate sea routes through the Sunda and Lombok Straits, but this would add 965 and 1600 nautical miles, respectively, to the total transit.<sup>25</sup> A blockading force of three ships in each strait could adequately inspect suspected shipping.<sup>26</sup> The amount of ships searched at a chokepoint is directly proportional to the forces involved, but a relatively small squadron could screen a large percentage of shipping and have a disproportionate effect on trade bound for China. The commander may elect to focus on a particular type of commodity if available force was inadequate to search all shipping. Currently the U.S. has an adequate surface force to carry out a distant blockade. Even assuming that a third of U.S. surface ships were unavailable due to maintenance, 62 destroyers, cruisers and frigates would be available to conduct blockading and associated operations.<sup>27</sup>

### **DENIAL OF CHINESE PORTS**

China's vast coastline and numerous ports appear to make any blockade difficult, but analysis shows this is not the case. Although it has 3000 seaports, just seven ports are used to unload over 90 percent of all imports and only four ports are used for the bulk of China's petroleum imports.<sup>28</sup> This lack of diversification in port facilities presents an opportunity for a U.S. force imposing a distant blockade. U.S. political leadership may not be willing to launch direct strikes against these ports and their associated infrastructure, but by employing offensive mining the U.S. may take advantage of this critical Chinese vulnerability.

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<sup>25</sup> Vego, "Chinese Shipping Could be Risky Business".

<sup>26</sup> Collins, "No Oil for the Lamps of China?" 87.

<sup>27</sup> List of U.S. Navy Ships, U.S. Navy, accessed on May 03, 2014, <http://navy.mil/navydataships/lists/shipalpha.asp>.

<sup>28</sup> Lawrence Spinetta, "The Malacca Dilemma – Countering China's "String of Pearls" With Land-Based Airpower", Defense Technical Information Center, 34. [www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA476931](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA476931).

The U.S. could declare maritime exclusion zones as part of a blockade in the vicinity of critical Chinese ports or throughout the waters of the South and East China Seas in order to keep neutral shipping away from the area of potential hostilities.<sup>29</sup> Exclusion zones have been accepted in the past by the international community. During the Falkland's War no state objected to the maritime exclusion zone declared by the United Kingdom and only four nations challenged the validity of its re-designation as a total exclusion zone.<sup>30</sup> Once established, it would be legal to employ mines as an element of the blockade of Chinese ports.<sup>31</sup> Offensive mining of this type could be conducted by aircraft or drones but the most effective platform would be submarines.<sup>32</sup> Chinese forces may not know the extent of U.S. mining or the locations of fields if laid by submarine. The threat of mines may well encourage neutral shipping to avoid the exclusion zones, and the targeting of major Chinese ports has the potential to reduce Chinese trade for as long as the conflict continued. Building alternative transportation and port loading infrastructure required to process a large volume of goods at other port facilities presents difficulties to China. If other port facilities were established they could be placed at risk by mines. It would also be difficult for China to clear the minefields once deployed. The capabilities of current influence mines present extreme challenges to mine sweeping operations that demand excellent equipment and time to conduct clearance operations.<sup>33</sup> Chinese mine countermeasure capabilities are limited, characterized by obsolete platforms and abilities.<sup>34</sup> Additionally, the mining of Chinese ports

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<sup>29</sup> NWP 1-14M, *The Commander's Handbook on the Law of Naval Operations*, (Washington D.C.: Department of the Navy Office of the Chief of Naval Operations, July 2007), 7-12.

<sup>30</sup> Nicholas Tracy, *Attack on Maritime Trade* (Toronto: University of Toronto Press, 1991) 224.

<sup>31</sup> NWP 1-14M, *The Commander's Handbook on the Law of Naval Operations*, 9-3.

<sup>32</sup> Victor L. Vescovo, "Deterring the Dragon...From (Under) the Sea," *Proceedings*, February 2014, <http://www.usni.org/magazines/proceedings/2014-02/deterring-dragon-under-sea>.

<sup>33</sup> Tracy, *Attack on Maritime Trade*, 219.

<sup>34</sup> Scott C. Truver, "Taking Mines Seriously: Mine Warfare in China's Near Seas," *Naval War College Review* 65 no. 2 (Spring 2012): 60.

would pose a risk to surface and subsurface forces attempting to sortie. The mining of Chinese harbors exploits a critical vulnerability of Chinese defenses.

### **ECONOMIC IMPACTS OF BLOCKADE**

Historically, blockades have require a long period of time to be effective and a distant blockade of China would be no different. A failure to understand the protracted time that may be required for a distant blockade to be effective by U.S. political leadership would have a negative impact on the techniques used and potentially the outcome of the conflict if misunderstood.<sup>35</sup> As an example, disrupting the flow of oil to China would not have an immediate effect on her war machine. China consumes slightly more than 9 million barrels of oil a day with over half of it provided by domestic production.<sup>36</sup> With that amount of domestic production unaffected by a blockade, Chinese military operations would not be placed at risk due to lack of oil. Additionally, China currently has a strategic reserve of 100 million barrels with plans to increase the reserve to 500 million barrels by 2020.<sup>37</sup> This would give China one hundred days of oil consumption at pre-blockade levels before effects could be expected on her economy, perhaps longer if China instituted rationing of supplies in an early stage of a blockade. This would suggest that a blockade may be ineffective to influence Chinese military actions, but the effect to China's economy could be devastating. It is estimated that the interruption of oil importation would cost \$883 billion to China's economy, a reduction of over 12 percent GDP from its 2011 level.<sup>38</sup> For a nation that

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<sup>35</sup>Vego, *Joint Operational Warfare*, III-20.

<sup>36</sup>Mandip Singh, "China's Strategic Petroleum Reserves: A Reality Check," Institute for Defense Studies and Analysis, last modified May 21, 2012, [http://www.idsa.in/issuebrief/ChinasStrategicPetroleumReserves\\_MandipSingh\\_210512](http://www.idsa.in/issuebrief/ChinasStrategicPetroleumReserves_MandipSingh_210512).

<sup>37</sup> Javier Blas, "China Stops Filling Strategic Oil Reserve," Financial Times, November 23, 2012, <http://www.ft.com/cms/s/0/c7090954-347d-11e2-8b86-00144feabdc0.html>.

<sup>38</sup> Sean Mirski, "Stronghold: The Context, Conduct and Consequences of an American Naval Blockade of China," Carnegie Endowment for International Peace, last modified February 12, 2013,

requires a 7 percent GDP increase per year to create jobs for the 17 million citizens entering the job market annually, any reduction in GDP threatens the stability of the Chinese state.<sup>39</sup>

Chinese domestic production is highly vulnerable to a blockade. A majority of Chinese exports are made from components imported from overseas and then exported after having been assembled into higher value goods. As an example, over 90% of Chinese high-tech production is assembled in this way and depends on imports to provide the basic components for manufacture.<sup>40</sup> Additionally, over 25 percent of Chinese imports are raw materials earmarked for domestic manufacturers to produce finished goods.<sup>41</sup> Without a domestic source of raw materials and components necessary to feed its industrial base, Chinese factories would close for want of raw materials and components, delivering a major blow to the economy. This reliance on overseas raw materials would also make the shifting of production facilities for domestic or military production difficult. The damage to China's economy would take time to manifest itself, but the effect would occur. U.S. political and military leaders would have to accept that in the short term no visible effects may be seen from the blockading efforts but trust that they would have a substantial effect on the Chinese economy and ability to prosecute a war.

## METHODS

Traditionally, imposing an effective blockade has been challenging. Locating merchant shipping bound for an enemy port is difficult when it can hide in the vastness of the ocean. While the exploitation of chokepoints would aid the U.S. during a blockade of China,

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<http://carnegieendowment.org/2013/02/12/stranglehold-context-conduct-and-consequences-of-american-naval-blockade-of-china/fowj#>.

<sup>39</sup> Dexter Roberts, "Why China Needs Such Rapid GDP Growth: More Jobs," Bloomberg BusinessWeek, April 4, 2014, <http://www.businessweek.com/articles/2014-04-04/why-china-needs-such-rapid-gdp-growth-more-jobs>.

<sup>40</sup> Mirski, "Stranglehold".

<sup>41</sup> Mirski, "Stranglehold".



new technology has provided the blockading power with effective means of locating and identifying shipping bound for a prohibited port. These advances promise to reduce the force necessary to maintain an effective blockade and remove the requirement to disperse blockading assets to cover a wide area of sea. Additionally, targeting port infrastructure itself can be accomplished through non-kinetic means, causing confusion in Chinese ports.

Unmanned aerial vehicles (UAVs) have revolutionized the collection of information and targeting in warfare. With extended endurance and no risk to a human crew, UAVs offer an excellent platform to monitor wide expanses of ocean. Extended-range UAVs can be land-based, launched from ships and even from submerged submarines.<sup>42</sup> The Scan Eagle UAV system is capable of remaining on station for up to fifteen hours and using a conventional or infrared camera to collect data.<sup>43</sup> With endurance superior to a maritime patrol aircraft and speed far greater than a surface ship, UAVs will drastically expand the area of ocean that can effectively be monitored. If shipping is detected that is unidentified, appears to be bound for Chinese ports or in a direction contrary to its declared next intended port of call, surface assets could be sent to board or seize the vessel.

Since 2005 all ships of 300 tons or more have been required to utilize the Automatic Identification System (AIS), a transponder which relays a vessel's identity, type, position, course and speed to other AIS-equipped ships and aircraft as well as shore facilities and satellites.<sup>44</sup> The review of past AIS data by a blockading force would enable the establishment of typical sailing patterns for individual ships, evaluate if they were

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<sup>42</sup> Daniel Parry, "Navy Launches UAV From Submerged Submarine," Naval Research Laboratory, last modified December 5, 2013, <http://www.nrl.navy.mil/media/news-releases/2013/navy-launches-uav-from-submerged-submarine>.

<sup>43</sup> Defense, Space and Security, Boeing, accessed on May 03, 2014, <http://www.boeing.com/boeing/defense-space/military/scaneagle/>.

<sup>44</sup> AIS Transponders, International Maritime Organization, accessed on May 3, 2014, <http://www.imo.org/OurWork/Safety/Navigation/Pages/AIS.aspx>.

maintaining historic routes and identify ships that did not appear to be conforming to the blockade. Ships that appeared to be deviating from their declared next port of call, ships that were known to partake in the China trade, or ships sighted but who failed to broadcast AIS data would deserve greater scrutiny than other vessels. This would allow a U.S. commander to economize the use of his forces, dispatching boarding teams to merchants whose AIS information raised concerns and allowing trusted vessels to continue on their journeys.

Another technological advance that would aid a blockading force is targeted cyber-attack. Almost all port facilities worldwide rely on an extensive computer network to transfer and process information. Computer networks track cargo as it is loaded onto shipping, utilize unloading cranes that depend on optical recognition of cargo to locate and categorize shipments and coordinate the trucks and railways that move goods from ports.<sup>45</sup> A directed cyber-attack against Chinese port facilities would have tremendous consequences. Shipping containers would arrive without a clean manifest to decipher what the contents were and the automated systems tasked with processing unloading operations would have to be operated manually. Targeting port radar and communication systems could cause a breakdown of vessel management by port authorities resulting in accidents or delay in authorizing ships to enter port.<sup>46</sup> The confusion and delay imposed would limit Chinese port authorities' ability to unload and manage any vessels that broke through a blockade. A cyber-attack on port facilities is attractive because it could have a large impact on operations without the political ramifications of a kinetic attack on the Chinese mainland.

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<sup>45</sup> Joseph Kramek, "The Critical Infrastructure Gap: U.S. Port Facilities and Cyber Vulnerabilities," The Brookings Institute Center for 21<sup>st</sup> Century Security and Intelligence Policy Paper, (July 2013): 1, <http://www.brookings.edu/~media/research/files/papers/2013/07/02%20cyber%20port%20security%20kramek/03%20cyber%20port%20security%20kramek.pdf>.

<sup>46</sup> Norbert Kouwenhoven, Martin Borrett, and Milind Wakankar, "The Implications and Threats of Cyber Security for Ports," *Port Technology International*, February 2014, [http://www.porttechnology.org/technical\\_papers/the\\_implications\\_and\\_threats\\_of\\_cyber\\_security\\_for\\_ports/#.U2WB81e9GNU](http://www.porttechnology.org/technical_papers/the_implications_and_threats_of_cyber_security_for_ports/#.U2WB81e9GNU).

## COUNTER ARGUMENTS

An argument can be made that a distant blockade of China would be counter-productive and waging warfare focused on maritime trade is unthinkable in an era of globalization. It is true that globalization has linked the economies of nations in a complex web where “an attack on any part of the world’s economic system could so easily rebound on the transgressor” and lead to political pressures from non-belligerent nations affected by a blockade.<sup>47</sup> As the largest trading nation in the world by total value, a campaign against Chinese trade would affect nearly every nation on the globe.<sup>48</sup> This could lead to political pressure on the U.S. to loosen or abandon a blockade of China from nations that would lose profits by it.

It is important to remember that a conflict between the U.S. and China would have severe global economic impacts on its own. At a minimum, it would sever trade between China, the U.S. and any other belligerents to the conflict. Based on the size of U.S. and Chinese trade volume, the current system of globalization would break down if open hostilities began in the Pacific between these states. While a blockade may amplify the effects on the larger global trading system, it also offers attractive possibilities for the U.S. and her allies. If China could be effectively isolated by maritime trade warfare and a distant blockade that capitalized on the geography of the western Pacific, it would allow the trading networks of the world to be reborn without Chinese participation.<sup>49</sup> Geography favors the U.S., which would retain access to trade routes via two oceans while an effective blockade

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<sup>47</sup> Geoffrey Till, “A Changing Focus for the Protection of Shipping,” *The Strategic Importance of Seaborne Trade and Campaigns* (Canberra, Australia: Sea Power Center, Papers in Australian Maritime Affairs, No. 10.2002): 14.

<sup>48</sup> Angela Monaghan, “China Surpasses US as World’s Largest Trading Nation,” *The Guardian*, January 10, 2014, <http://www.theguardian.com/business/2014/jan/10/china-surpasses-us-world-largest-trading-nation>.

<sup>49</sup> T. X. Hammes, “Offshore Control: A proposed Strategy for an Unlikely Conflict,” *National Defense University Strategic Forum*, SF no. 278 (June 2012): 12, <http://inss.dodlive.mil/files/2012/09/SF-278.pdf>.

would limit China to trading over long and inefficient ground routes through Asia. Globally, merchants would continue to seek markets for products, and new production centers would be established to make up for the lack of Chinese production. While it may take time for global markets to readjust, they would do so over time and a strategy focused on maritime trade warfare has the potential to be a long conflict.

Some argue that it would be unthinkable for a U.S. commander to use force against merchant ships that attempted to violate a blockade. The images of surface ships or mines sinking unarmed merchants would inflame global opinion, bringing pressure on the U.S. to cease a blockade. During operations over the past three decades U.S. operations have often been framed by opponents as heartless and contrary to the Law of Armed Conflict. The bombing of a supposed “baby milk factory” during Operation Desert Storm was presented by Iraqi officials to the global media as an American outrage against the people of Iraq.<sup>50</sup> Similar images of U.S. attacks on merchant ships could be used by China to erode U.S. domestic and international support for a conflict.

It is undeniable that trade warfare offers opportunities for propaganda, but any military action could be framed in a way to assist a belligerent’s information operations. If the U.S. conducted direct strikes on the Chinese mainland to degrade the A2/AD system, collateral damage and mistargeting would provide ample occasions for China to frame U.S. operations in an unfavorable light. These could be far more damaging than images of sinking merchant vessels. U.S. information operations supporting a trade warfare campaign would be critical. It would need to highlight the risks to shipping that decided to violate the blockade and enter exclusion zones and frame their actions as recklessly entering a warzone.

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<sup>50</sup> Kathleen T. Rhem, “Iraqi Denial and Deception Far Beyond Battlefield Tactics,” US Department of Defense, last modified October 8, 2002, <http://www.defense.gov/news/newsarticle.aspx?id=42641>.

The U.S. would need to stress that compliance with the blockade would enable merchant vessels to trade safely outside of any exclusion zones established.

Some criticize a distant blockade of China because of the disruption it would have on regional trade throughout the Western Pacific. Japan, South Korea and other Asian nations depend on the flow of large amounts of oil through the Strait of Malacca to power their economies.<sup>51</sup> Asian trading nations depend on access through the Strait to import and export raw materials, finished goods and food. A U.S. blockade in the region could interrupt these critical trade flows, decreasing support among regional nations.

While conducting trade warfare against China, the U.S. would have to be sensitive to the trading demands of nations in the region while maintaining the integrity of the blockade. This could be accomplished in a number of ways. The U.S. could mimic the United Kingdom's NAVICERT system. During both World Wars, the United Kingdom introduced a policy where all neutral shipping bound for Europe and North Africa would bear a certification from British authorities that the cargo was not bound for Germany.<sup>52</sup> Ships sailing without a valid NAVICERT were liable for seizure by British naval forces if they approached or entered the area of hostilities. A system like this would simplify blockading actions and increase the speed with which ships could be cleared to proceed to their next port of call. Allied nations and trusted states could be empowered to examine and vouch for cargos originating in their ports or carried by vessels under their flag. Another option is to employ a blockade by convoy. Convoys could be formed at designated screening areas, organized based on a common destination port or nation, and escorted by U.S., allied or

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<sup>51</sup> World Transit Oil Chokepoints, U.S. Energy Information Administration, last modified August 22, 2012, <http://www.eia.gov/countries/regions-topics.cfm?fips=wotc&trk=p3>.

<sup>52</sup> Geoffrey Till, "From *Naval Blockades and Economic Warfare, Europe 1939-45*," in *Naval Blockades and Seapower: Strategies and Counter-Strategies, 1805-2005*, ed. Bruce Elleman (New York: Routledge, 2006), 123.

destination nation warships.<sup>53</sup> The escort would ensure the vessels continued to their declared destination. If forces were inadequate to escort every convoy, a U.S. or coalition military team could be embarked on a merchant ship in the convoy and ensure no vessels departed the group for Chinese ports. Ships that did this would be reported and targeted by U.S. forces. Any ship that successfully reached a Chinese port after violating the NAVICERT or convoy system would be liable for targeting or seizure once it was underway again.

Another criticism of a distant blockade is it may drive China to execute an anti-shipping campaign of its own against the United States or her allies in the region. Due to historic ties and common interests, it is possible that South Korea or Japan may be belligerents against China alongside the U.S. and their trade may be placed at risk. Geography favors U.S. efforts to protect trade flows to both nations. South Korea and Japan possess large ports on their east coasts which could be used as alternative ports of call for merchant vessels. Air launched attacks on shipping bound for these ports would necessitate Chinese air assets flying over integrated air defense systems in both nations which could attrite Chinese forces.<sup>54</sup> China would also be faced with difficulties employing submarines to sink merchant shipping bound for South Korea or Japan. To effect trade bound for eastern ports in both nations, “any Chinese submarine must transit relatively confined waters and operate outside the land-based antiaircraft umbrella.”<sup>55</sup> This would allow the U.S. and her allies to prosecute Chinese submarines with maritime patrol aircraft which could operate with a high degree of safety.<sup>56</sup> An attack on U.S. trade by Chinese forces would also be

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<sup>53</sup> Collins, “No Oil for the Lamps of China?” 90.

<sup>54</sup> T. X. Hammes, “Offshore Control”, 8.

<sup>55</sup> Ibid., 8.

<sup>56</sup> Ibid., 8.

challenged by China's interior geographic position. She would be forced to project power beyond her A2/AD system to interrupt the presumably re-routed Pacific trade routes between the U.S. and the rest of Asia, leaving air, surface and subsurface assets so tasked vulnerable to attack. It is worth noting any Chinese force employed in anti-trade warfare against the U.S. or her allies would reduce the force available in the interior of their A2/AD system. If the Chinese made a concerted effort to impact U.S., South Korean or Japanese trade it may find it has over-committed resources required to maintain her A2/AD system to achieve results against a difficult secondary objective.

## CONCLUSIONS

A conflict between the U.S. and China is not a foregone conclusion; however, "it is an old military maxim that intentions could change overnight – especially in authoritarian regimes – one must focus on the military capabilities of other states."<sup>57</sup> China's current A2/AD systems are sophisticated, and becoming ever more lethal. It is likely that "as Chinese military capabilities steadily develop, the U.S. ability to project power in the Western Pacific and the credibility of its guarantees to regional security partners will inevitably be questioned."<sup>58</sup> The U.S. has the choice to pursue technologies and employ forces directly against these A2/AD systems. This will necessitate a high degree of financial cost, and the employment of forces against a robust multi-dimensional A2/AD system will likely lead to U.S. military losses. Potentially, challenging an A2/AD system by direct means may push China to escalate a limited conflict by attacking U.S. bases and allies throughout the Pacific.

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<sup>57</sup> Van Tol, *AirSea Battle*, x.

<sup>58</sup> *Ibid.*, 3.

As an alternative, the U.S. could choose to focus operations on the disruption and destruction of Chinese trade. Trade warfare could have a very real effect on the Chinese economy in the long term, creating economic deprivation for the Chinese people and raising the costs of a conflict to Chinese leadership. It could be tailored to exact varying degrees of economic damage to the Chinese economy, encouraging negotiation as the economic effects are increased. It would be possible to execute with current force structure, and be aided by recent advances in technology such as UAVs and AIS. A maritime trade warfare campaign may provide a potentially war-winning option to political leadership in place of strikes against the Chinese mainland which would pose a grave risk to our forces and could be politically unpalatable. Perhaps most importantly, it would allow the U.S. to select the location of its primary effort far out of range of most Chinese forces, rendering them less effective, and provide the U.S. the option to penetrate the A2/AD system at time of its own choosing while having a real effect on China's economy in the interim.<sup>59</sup>

A trade warfare campaign would not lead to a quick victory. It demands that the U.S. possess the political resolve to prosecute a long war that would impact the global economy. The willingness of the U.S. to resort to trade warfare could influence the decision-making of Chinese leadership prior to engaging in a conflict. If China believes its A2/AD systems would prevent U.S. military operations in the East and South China Seas, it would not have a deterrent to start a conflict. It could wait to initiate conflict at a time it assessed A2/AD capabilities were able to thwart U.S. operations. By accepting and planning a strategy of maritime trade warfare, the U.S. would offer a deterrent to Chinese aggression and encourage stability in the region even if a Chinese A2/AD system could guarantee sea denial in the Near

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<sup>59</sup> T. X. Hammes, "Offshore Control", 5.



Seas. It would negate Chinese reliance on A2/AD systems for security by threatening the Chinese economy, imposing real costs on Chinese aggression.

## **RECOMMENDATIONS**

Executing a campaign focused on maritime trade warfare will require a force that is trained and equipped to conduct the mission. Operational commanders should ensure the units under their command conduct integrated, true-to-life training scenarios that focus on the interdiction of merchant shipping. Training should focus on the ways to verify a vessel's manifest in an efficient time-sensitive manner. Command and control measures should be exercised to ensure the commander has a complete picture of the interdiction operations and can make decisions in an efficient manner. The blockading force should receive clear, simple direction so that operations can continue even if command and control is degraded by an opponent's attack on communications networks. Challenges to blockading ships posed by counter blockading forces, most likely large surface combatants and submarines, should be integrated into the training as well as the potential rules of engagement that could be employed.

If the U.S. conducted a total blockade of China, nations in the region that benefit from trade with China and depend on the free flow of goods throughout the South-Western Pacific could feel threatened. The U.S. should continue to build relationships with nations that could be most affected by a blockade of China, and discuss how trade links to them could remain open with as little disruption as possible. Our allies should be aware a NAVICERT or convoy system could be used to keep their maritime trade moving, and be comfortable with the details of such a system. Regional engagement can build trust in the U.S. as a partner and

reassure nations affected by a blockade that the mitigation of any disruption to their trade is a U.S. priority.

The U.S. should ensure that “in peacetime, both enemies and potential allies must be able to see that the United States is providing sufficient training and forces to execute its strategy in time of war.”<sup>60</sup> Chinese leadership must be aware that maritime trade warfare is viewed as legitimate and the preferred option in any conflict involving the U.S. or her allies. This can be accomplished by strategic messaging from key political and military leaders or through the execution of regional exercises focused on trade interdiction. China should understand that the U.S. is serious about trade warfare and take this threat as a consideration in any strategic decision that could result in conflict. The threat to Chinese trade will influence decisions made by Chinese leadership and may encourage peaceful resolutions to regional issues.

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<sup>60</sup> T. X. Hammes, “Offshore Control”, 6.

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